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|--------------|---------------------------|----|--------------|-------------------------------|----|
| 60/141,031   | 25 June 1999 (25.06.1999) | US | 199 33 004.2 | 14 July 1999 (14.07.1999)     | DE |
| 199 30 476.9 | 1 July 1999 (01.07.1999)  | DE | 199 33 005.0 | 14 July 1999 (14.07.1999)     | DE |
| 60/142,101   | 2 July 1999 (02.07.1999)  | US | 199 33 006.9 | 14 July 1999 (14.07.1999)     | DE |
| 199 31 415.2 | 8 July 1999 (08.07.1999)  | DE | 60/148,613   | 12 August 1999 (12.08.1999)   | US |
| 199 31 418.7 | 8 July 1999 (08.07.1999)  | DE | 199 40 764.9 | 27 August 1999 (27.08.1999)   | DE |
| 199 31 419.5 | 8 July 1999 (08.07.1999)  | DE | 199 40 765.7 | 27 August 1999 (27.08.1999)   | DE |
| 199 31 420.9 | 8 July 1999 (08.07.1999)  | DE | 199 40 766.5 | 27 August 1999 (27.08.1999)   | DE |
| 199 31 424.1 | 8 July 1999 (08.07.1999)  | DE | 199 40 832.7 | 27 August 1999 (27.08.1999)   | DE |
| 199 31 428.4 | 8 July 1999 (08.07.1999)  | DE | 199 41 378.9 | 31 August 1999 (31.08.1999)   | DE |
| 199 31 434.9 | 8 July 1999 (08.07.1999)  | DE | 199 41 379.7 | 31 August 1999 (31.08.1999)   | DE |
| 199 31 435.7 | 8 July 1999 (08.07.1999)  | DE | 199 41 394.0 | 31 August 1999 (31.08.1999)   | DE |
| 199 31 443.8 | 8 July 1999 (08.07.1999)  | DE | 199 41 396.7 | 31 August 1999 (31.08.1999)   | DE |
| 199 31 453.5 | 8 July 1999 (08.07.1999)  | DE | 199 41 380.0 | 31 August 1999 (31.08.1999)   | DE |
| 199 31 457.8 | 8 July 1999 (08.07.1999)  | DE | 199 42 077.7 | 3 September 1999 (03.09.1999) | DE |
| 199 31 465.9 | 8 July 1999 (08.07.1999)  | DE | 199 42 129.3 | 3 September 1999 (03.09.1999) | DE |
| 199 31 478.0 | 8 July 1999 (08.07.1999)  | DE | 199 42 076.9 | 3 September 1999 (03.09.1999) | DE |
| 199 31 510.8 | 8 July 1999 (08.07.1999)  | DE | 199 42 079.3 | 3 September 1999 (03.09.1999) | DE |
| 199 31 541.8 | 8 July 1999 (08.07.1999)  | DE | 199 42 086.6 | 3 September 1999 (03.09.1999) | DE |
| 199 31 573.6 | 8 July 1999 (08.07.1999)  | DE | 199 42 087.4 | 3 September 1999 (03.09.1999) | DE |
| 199 31 592.2 | 8 July 1999 (08.07.1999)  | DE | 199 42 088.2 | 3 September 1999 (03.09.1999) | DE |
| 199 31 632.5 | 8 July 1999 (08.07.1999)  | DE | 199 42 095.5 | 3 September 1999 (03.09.1999) | DE |
| 199 31 634.1 | 8 July 1999 (08.07.1999)  | DE | 199 42 124.2 | 3 September 1999 (03.09.1999) | DE |
| 199 31 636.8 | 8 July 1999 (08.07.1999)  | DE | 60/187,970   | 9 March 2000 (09.03.2000)     | US |
| 199 32 125.6 | 9 July 1999 (09.07.1999)  | DE |              |                               |    |
| 199 32 126.4 | 9 July 1999 (09.07.1999)  | DE |              |                               |    |
| 199 32 130.2 | 9 July 1999 (09.07.1999)  | DE |              |                               |    |
| 199 32 186.8 | 9 July 1999 (09.07.1999)  | DE |              |                               |    |
| 199 32 206.6 | 9 July 1999 (09.07.1999)  | DE |              |                               |    |
| 199 32 227.9 | 9 July 1999 (09.07.1999)  | DE |              |                               |    |
| 199 32 228.7 | 9 July 1999 (09.07.1999)  | DE |              |                               |    |
| 199 32 229.5 | 9 July 1999 (09.07.1999)  | DE |              |                               |    |
| 199 32 230.9 | 9 July 1999 (09.07.1999)  | DE |              |                               |    |
| 199 32 922.2 | 14 July 1999 (14.07.1999) | DE |              |                               |    |
| 199 32 926.5 | 14 July 1999 (14.07.1999) | DE |              |                               |    |
| 199 32 928.1 | 14 July 1999 (14.07.1999) | DE |              |                               |    |
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- (72) Inventors: [REDACTED] Markus; Wenjenstr. 21, D-67251 Freinsheim (DE). KRÖGER, Burkhard; Im Waldhof 1, D-67117 Limburgerhof (DE). SCHRÖDER, Hartwig; Goethestr. 5, D-69226 Nussloch (DE). ZELDER, Oskar; Rossmarktstr. 27, D-67346 Speyer (DE). HABERHAUER, Gregor; Moselstr. 42, D-67117 Limburgerhof (DE).
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE,

[Continued on next page]

(54) Title: CORYNEBACTERIUM GLUTAMICUM GENES ENCODING METABOLIC PATHWAY PROTEINS

(57) Abstract: Isolated nucleic acid molecules, designated MP nucleic acid molecules, which encode novel MP proteins from *Corynebacterium glutamicum* are described. The invention also provides antisense nucleic acid molecules, recombinant expression vectors containing MP nucleic acid molecules, and host cells into which the expression vectors have been introduced. The invention still further provides isolated MP proteins, mutated MP proteins, fusion proteins, antigenic peptides and methods for the improvement of production of a desired compound from *C. glutamicum* based on genetic engineering of MP genes in this organism.

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LOCUS AX063913 1170 bp DNA linear PAT 24-JAN-2001  
 DEFINITION Sequence 195 from Patent WO0100843.  
 ACCESSION AX063913  
 VERSION AX063913.1 GI:12541625  
 KEYWORDS  
 SOURCE Corynebacterium glutamicum.  
 ORGANISM Corynebacterium glutamicum  
 Bacteria; Firmicutes; Actinobacteria; Actinobacteridae;  
 Actinomycetales; Corynebacterineae; Corynebacteriaceae;  
 Corynebacterium.  
 REFERENCE 1 (bases 1 to 1170)  
 AUTHORS Pompejus, M., Kroeger, B., Schroeder, H., Zelder, O. and Häberhauer, G.  
 TITLE corynebacterium glutamicum genes encoding metabolic pathway  
 proteins  
 JOURNAL Patent: WO 0100843-A 195 04-JAN-2001;  
 BASF AKTIENGESSELLSCHAFT (DE)

Query Match 99.9%; Score 1144.4; DB 6; Length 1170;  
 Best Local Similarity 99.9%; Pred. No. 2,4e-311;  
 Matches 1145; Conservative 0; Mismatches 1; Indels 0; Gaps 0;

Qy	1	ATGAATTTTACCCACCATCTGTACCTATTAACCTGCGTGGCGTCCACCCACAGTA	60
Db	2	ATGAATTTTACCCACCATCTGTACCTATTAACCTGCGTGGCGTCCACCCACAGTA	61
Qy	61	GTGCAAGCGGGACGGCCAGCCAGAACTCCTGGTGCGCCGATGAACCCACCTATCACGTTG	120
Db	62	GTGCAAGCGGGACGGCCAGCCAGAACTCCTGGTGCGCCGATGAACCCACCTATCACGTTG	121
Qy	121	TCCAGCACTTATGTTTCATGATTCAGAAAAAGCTTATGGGCGCGATGGCAATGATGGATGG	180
Db	122	TCCAGCACTTATGTTTCATGATTCAGAAAAAGCTTATGGGCGCGATGGCAATGATGGATGG	181
Qy	181	GGTGCAATTTGAGGCTGCCATGGGAACCTAGATGGTGGGTTTCGCGGTATCTTATTCTTCA	240
Db	182	GGTGCAATTTGAGGCTGCCATGGGAACCTAGATGGTGGGTTTCGCGGTATCTTATTCTTCA	241
Qy	241	GGTTTGGCAGCGGCAACGTCGATTGCTGATTTGGTTCTACTGGTGGCACAGTTGTTTTA	300
Db	242	GGTTTGGCAGCGGCAACGTCGATTGCTGATTTGGTTCTACTGGTGGCACAGTTGTTTTA	301
Qy	301	CCTAAAGCTGCCTATTATGGCGTGACCAATATTTTCGCCAGGATGGAAGCCCGCGGAAGG	360
Db	302	CCTAAAGCTGCCTATTATGGCGTGACCAATATTTTCGCCAGGATGGAAGCCCGCGGAAGG	361
Qy	361	CTGAAGGTTTCAACTGTTGATGCAGACAATACCGAAGAAGTGATTGCTGCTGCTCAAGGT	420
Db	362	CTGAAGGTTTCAACTGTTGATGCAGACAATACCGAAGAAGTGATTGCTGCTGCTCAAGGT	421
Qy	421	GCAGATGTGGTGTGGGTGGAATCGATCGCTAATCCGACGATGGTGGTAGCTGATATCCCT	480
Db	422	GCAGATGTGGTGTGGGTGGAATCGATCGCTAATCCGACGATGGTGGTAGCTGATATCCCT	481
Qy	481	GCAATAGTCGACGGTGTGCGTGGGCTTGGAGTTTTGACTGTCGTTGACGCGACTTTTCGCA	540
Db	482	GCAATAGTCGACGGTGTGCGTGGGCTTGGAGTTTTGACTGTCGTTGACGCGACTTTTCGCA	541

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Qy	541	ACGCCACTTCGTCAACGTCCATTGGAACCTGGTGCTGATATTGTGCTTTACTCGGCAACC	600
Db	542	ACGCCACTTCGTCAACGTCCATTGGAACCTGGTGCTGATATTGTGCTTTACTCGGCAACC	601
Qy	601	AAACTTATCGGTGGACACTCTGATCTTCTTCTTGGAGTCGCAGTGTGCAAGTCTGAGCAC	660
Db	602	AAACTTATCGGTGGACACTCTGATCTTCTTCTTGGAGTCGCAGTGTGCAAGTCTGAGCAC	661
Qy	661	CATGCGCAGTTTCTTGCCACTCACCGTCATGATCATGGTTTCAGTGCCGGGAGGTCTTGAA	720
Db	662	CATGCGCAGTTTCTTGCCACTCACCGTCATGATCATGGTTTCAGTGCCGGGAGGTCTTGAA	721
Qy	721	GCGTTTCTTGCTCTCCGTGGATTGTATTCTTGGCGGTGCGTCTTGATCGAGCAGAATCC	780
Db	722	GCGTTTCTTGCTCTCCGTGGATTGTATTCTTGGCGGTGCGTCTTGATCGAGCAGAATCC	781
Qy	781	AACGCAGCAGAACTTTTCGCGGCGACTTAACGCGCATCCTTCGGTTACCCGCGTCAATTAT	840
Db	782	AACGCAGCAGAACTTTTCGCGGCGACTTAACGCGCATCCTTCGGTTACCCGCGTCAATTAT	841
Qy	841	CCAGGACTTCCTGATGATCCCCAACATGAAAAAGCCGTGCGAGTCCTACCCTCTGGATGT	900
Db	842	CCAGGACTTCCTGATGATCCCCAACATGAAAAAGCCGTGCGAGTCCTACCCTCTGGATGT	901
Qy	901	GGAAACATGTTGTCATTTGAGCTTGATGCAACACCTGAACGAACTGATGAGATTCTCGAA	960
Db	902	GGAAACATGTTGTCATTTGAGCTTGATGCAACACCTGAACGAACTGATGAGATTCTCGAA	961
Qy	961	AGCCTGTCACTTTTAACCCACGCGACCAGTTGGGGAGGTGTGGAAACAGCCATTGAACGT	1020
Db	962	AGCCTGTCACTTTTAACCCACGCGACCAGTTGGGGAGGTGTGGAAACAGCCATTGAACGT	1021
Qy	1021	CGCACCAGGCGGGATGCTGAAGTGGTGGCAGGAGTACCGATGACTCTTTGCCGCGTTTCC	1080
Db	1022	CGCACCAGGCGGGATGCTGAAGTGGTGGCAGGAGTACCGATGACTCTTTGCCGCGTTTCC	1081
Qy	1081	GTAGGAATTGAAGACGTTGAAGATCTATGGGAAGACCTCAACGCCTCAATCGACAAAGTT	1140
Db	1082	GTAGGAATTGAAGACGTTGAAGATCTATGGGAAGACCTCAACGCCTCAATCGACAAAGTT	1141
Qy	1141	CTGGGT	1146
Db	1142	CTGGGT	1147

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 DEFINITION Sequence 195 from Patent WO0100843.  
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 VERSION AX063913.1 GI:12541625  
 KEYWORDS  
 SOURCE Corynebacterium glutamicum.  
 ORGANISM Corynebacterium glutamicum  
 Bacteria; Firmicutes; Actinobacteria; Actinobacteridae;  
 Actinomycetales; Corynebacterineae; Corynebacteriaceae;  
 Corynebacterium.  
 REFERENCE 1 (bases 1 to 1170)  
 AUTHORS Pompejus, M., Kroeger, B., Schroeder, H., Zelder, O. and Haberhauer, G.  
 TITLE corynebacterium glutamicum genes encoding metabolic pathway  
 proteins.  
 JOURNAL Patent: WO 0100843-A 195 04-JAN-2001;  
 BASF AKTIENGESELLSCHAFT (DE)

Alignment Scores:

Pred. No.:	4.9e-119	Length:	1170
Score:	1960.00	Matches:	381
Percent Similarity:	99.74%	Conservative:	0
Best Local Similarity:	99.74%	Mismatches:	1
Query Match:	99.59%	Indels:	0
DB:	6	Gaps:	0

US-09-919-831-3 (1-382) x AX063913 (1-1170)

Qy	1	MetAsnPheTyrProProSerValProIleAsnProAlaTrpArgProProThrValThr	20
Db	2	ATGAATTTTACCCACCATCTGTACCTATTAACCCTGCGTGGCGTCCACCCACAGTAACT	61
Qy	21	ValGlnAlaGlyArgProAlaArgThrProGlyAlaProMetAsnProProIleThrLeu	40
Db	62	GTGCAAGCGGGACGGCCAGCCAGAAGCTCCTGGTGCGCCGATGAACCCACCTATCACGTTG	121
Qy	41	SerSerThrTyrValHisAspSerGluLysAlaTyrGlyArgAspGlyAsnAspGlyTrp	60
Db	122	TCCAGCACTTATGTTTCATGATTGAGAAAAAGCTTATGGGCGCGATGGCAATGATGGATGG	181
Qy	61	GlyAlaPheGluAlaAlaMetGlyThrLeuAspGlyGlyPheAlaValSerTyrSerSer	80
Db	182	GGTGCATTTGAGGCTGCCATGGGAAGCTTAGATGGTGGGTTCGCGGTATCTTATTCTTCA	241
Qy	81	GlyLeuAlaAlaAlaThrSerIleAlaAspLeuValProThrGlyGlyThrValValLeu	100
Db	242	GGTTTGGCAGCGGCAACGTCGATTGCTGATTTGGTTCTACTGGTGGCACAGTTGTTTTTA	301
Qy	101	ProLysAlaAlaTyrTyrGlyValThrAsnIlePheAlaArgMetGluAlaArgGlyArg	120
Db	302	CCTAAAGCTGCCTATTATGGCGTGACCAATATTTTCGCCAGGATGGAAGCCCGCGGAAGG	361
Qy	121	LeuLysValArgThrValAspAlaAspAsnThrGluGluValIleAlaAlaAlaGlnGly	140
Db	362	CTGAAGGTTGCAACTGTTGATGCAGACAATACCGAAGAAGTGATTGCTGCTGCTCAAGGT	421
Qy	141	AlaAspValValTrpValGluSerIleAlaAsnProThrMetValValAlaAspIlePro	160

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Db 422 GCAGATGTGGTGTGGGTGGAATCGATCGCTAATCCGACGATGGTGGTAGCTGATATCCCT 481  
 Qy 161 AlaIleValAspGlyValArgGlyLeuGlyValLeuThrValValAspAlaThrPheAla 180  
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 Db 482 GCAATAGTCGACGGTGTGCGTGGGCTTGGAGTTTTGACTGTCGTTGACGCGACTTTCGCA 541  
 Qy 181 ThrProLeuArgGlnArgProLeuGluLeuGlyAlaAspIleValLeuTyrSerAlaThr 200  
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 Db 542 ACGCCACTTCGTCAACGTCCATTGGAACCTGGTGCTGATATTGTGCTTTACTCGGCAACC 601  
 Qy 201 LysLeuIleGlyGlyHisSerAspLeuLeuLeuGlyValAlaValCysLysSerGluHis 220  
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 Db 602 AAATTATCGGTGGACACTCTGATCTTCTTCTTGGAGTCGCAGTGTGCAAGTCTGAGCAC 661  
 Qy 221 HisAlaGlnPheLeuAlaThrHisArgHisAspHisGlySerValProGlyGlyLeuGlu 240  
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 Db 662 CATGCGCAGTTTCTTGCCACTCACCGTCATGATCATGGTTCAGTGCCGGGAGGTCTTGAA 721  
 Qy 241 AlaPheLeuAlaLeuArgGlyLeuTyrSerLeuAlaValArgLeuAspArgAlaGluSer 260  
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 Db 722 GCGTTTCTTGCTCTCCGTGGATTGTATTCCTTGGCGGTGCGTCTTGATCGAGCAGAATCC 781  
 Qy 261 AsnAlaAlaGluLeuSerArgArgLeuAsnAlaHisProSerValThrArgValAsnTyr 280  
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 Db 782 AACGCAGCAGAACTTTCGCGGCGACTTAACGCGCATCCTTCGGTTACCCGCGTCAATTAT 841  
 Qy 281 ProGlyLeuProAspAspProGlnHisGluLysAlaValArgValLeuProSerGlyCys 300  
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 Db 842 CCAGGACTTCCTGATGATCCCCAACATGAAAAAGCCGTGCGAGTCCTACCCTCTGGATGT 901  
 Qy 301 GlyAsnMetLeuSerPheGluLeuAspAlaThrProGluArgThrAspGluIleLeuGlu 320  
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 Db 902 GGAAACATGTTGTGCTTTGAGCTTGATGCAACACCTGAACGAACTGATGAGATTCTCGAA 961  
 Qy 321 SerLeuSerLeuLeuThrHisAlaThrSerTrpGlyGlyValGluThrAlaIleGluArg 340  
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 Db 962 AGCCTGTCACTTTTAACCCACGCGACCAGTTGGGGAGGTGTGGAACAGCCATTGAACGT 1021  
 Qy 341 ArgThrArgArgAspAlaGluValValAlaGlyValProMetThrLeuCysArgValSer 360  
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 Db 1022 CGCACCAGGCGGGATGCTGAAGTGGTGGCAGAAGTACCGATGACTCTTTGCCGCGTTTCC 1081  
 Qy 361 ValGlyIleGluAspValGluAspLeuTrpGluAspLeuAsnAlaSerIleAspLysVal 380  
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 Db 1082 GTAGGAATTGAAGACGTTGAAGATCTATGGGAAGACCTCAACGCCTCAATCGACAAAGTT 1141  
 Qy 381 LeuGly 382  
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 Db 1142 CTGGGT 1147

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